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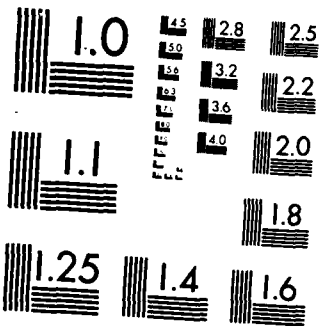

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During the past three months the project team has focused efforts in the following areas:

- Customer/Contractor Meeting
- Measurement Techniques Investigation
- Software Design Investigation
- Testing Flow Chart
- Computer Simulations
- Preliminary Switch Design
- ECP Formalization/Generation

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"AUTOMATIC MICROWAVE SEMICONDUCTOR
DEVICE TESTING"

THIRD QUARTERLY PROGRESS REPORT
(JANUARY 16, 1986 to April 15, 1986)

This project has been accomplished as part of the US Army Manufacturing Methods and Technology (MM&T) Program, which has as its objective the timely establishment of manufacturing processes, techniques or equipment to insure the efficient production of current or future defense programs.

THIRD QUARTERLY REPORT

(January 16, 1986 - April 15, 1986)

During the past three months the Automatic Microwave Semiconductor Device Tester (AMSDT) project team has focused on work in the following areas:

- Customer/Contractor Meeting
- Measurement Techniques Investigations
- Software Design Investigation
- Testing Flow Chart
- Computer Simulations
- Preliminary Switch Design
- ECP Formalization/Generation

1. CUSTOMER/CONTRACTOR MEETING

A meeting was held between representatives of the US Army Communications-Electronics Command (USACECOM) and Harris GSSD at Fort Monmouth, N.J. on 14 February 1986, to discuss the status of the AMSDT project. At this meeting the following documentation was given to USACECOM representatives:

- AMSDT System Overview Block Diagram
- Table of S-Parameter Measurements
- Table of Programmable Scope Measurements
- Table of Spectrum Analyzer Measurements
- Software Flow Charts
- Scenario of Testing Philosophy
- Multi-User Configurations
- Status of Hardware Ordered
- Status of Hardware Not Ordered
- Technical Review of AMSDT Station
- Tutorial paper on General S-Parameter Measurements with an Arbitrary Termination Impedance
- Software Design Paper for AMSDT

2. MEASUREMENT TECHNIQUES INVESTIGATIONS

The project team has written four tutorial papers concerning the following:

(a) "Generalized 'S'-Parameters with Arbitrary Terminated Impedance". This paper details generalized 'S'-parameter measurements with an arbitrary termination in terms of measured 'S'-parameters and a reference resistance termination. The results of this paper will provide the project team mathematical tools to calculate the true performance of devices under test from the measured data of the HP8510A Network Analyzer.

(b) "Stability Factor as a Function of Input and Output Reflection Coefficient in Terms of 'S'-Parameters". The results of this paper will provide the project team mathematical equations to determine the stability factors for devices under test. A particular application will be in the determination of the negative resistance of an IMPATT diode as measured by the HP8510A Network Analyzer.

(c) "Power Gain Analysis in Terms of 'S'-Parameters".
This paper develops the power gain equations for various semiconductor devices, such as a FET and bipolar transistor amplifier, in terms of the device'S'-parameters and stability factor. This paper concludes with criteria needed to obtain maximum operating power gain determination of these devices using the HP8510A Network Analyzer.

(d) "Matching Networks for Measurement Enhancement".
This paper details two types of matching networks:

(i) Input matching network in terms of output port reflection coefficients.

(ii) Input and output simultaneous matching networks.

The results of these latter two papers will be used to enhance the microwave measurements and to eliminate the system cabling effects which may cause the device-under-test to operate at a potentially unstable state during the measurement.

3. SOFTWARE DESIGN INVESTIGATION

A detailed software design analysis has been completed for the AMSDT Project. The analysis illustrates, via flow chart , the following events in the AMSDT test scenerio:

Human Interface

System Turn-on Display and Screen Selections

Function of Test Program Manager

Sample of Device Selection and Device Operational Range

Sample of Device Parameter Selection

Test Executive Function

Function of Category Processor

Function of Data Base Manager

Function of Special Applications

Program Language Flow Chart

4. TESTING FLOW CHART

Work is proceeding on the completion of a software testing flow chart for measurement events in the AMSDT testing scenario. The implementation of the S-parameter data from the hardware is being integrated into this flow chart in order to arrive at a complete test flow description.

5. COMPUTER SIMULATIONS

In the absence of the HP300 computer system, the project team is preparing software simulations using the Harris H800 Computer to represent AMSDT screen input data formats and the data base file. During the current reporting period simulations were also designed which would develop techniques for menu driver routines and program loader routines. The project team expects that these simulations can be transferred over to the HP300 computer with a minimum of software changes.

6. PRELIMINARY SWITCH DESIGN

Design work has begun on the AMSDT I/O (Input/Output) switch. This assembly, under program control, will switch most of the stimulus and measurement hardware instrumentation to the device-under-test.

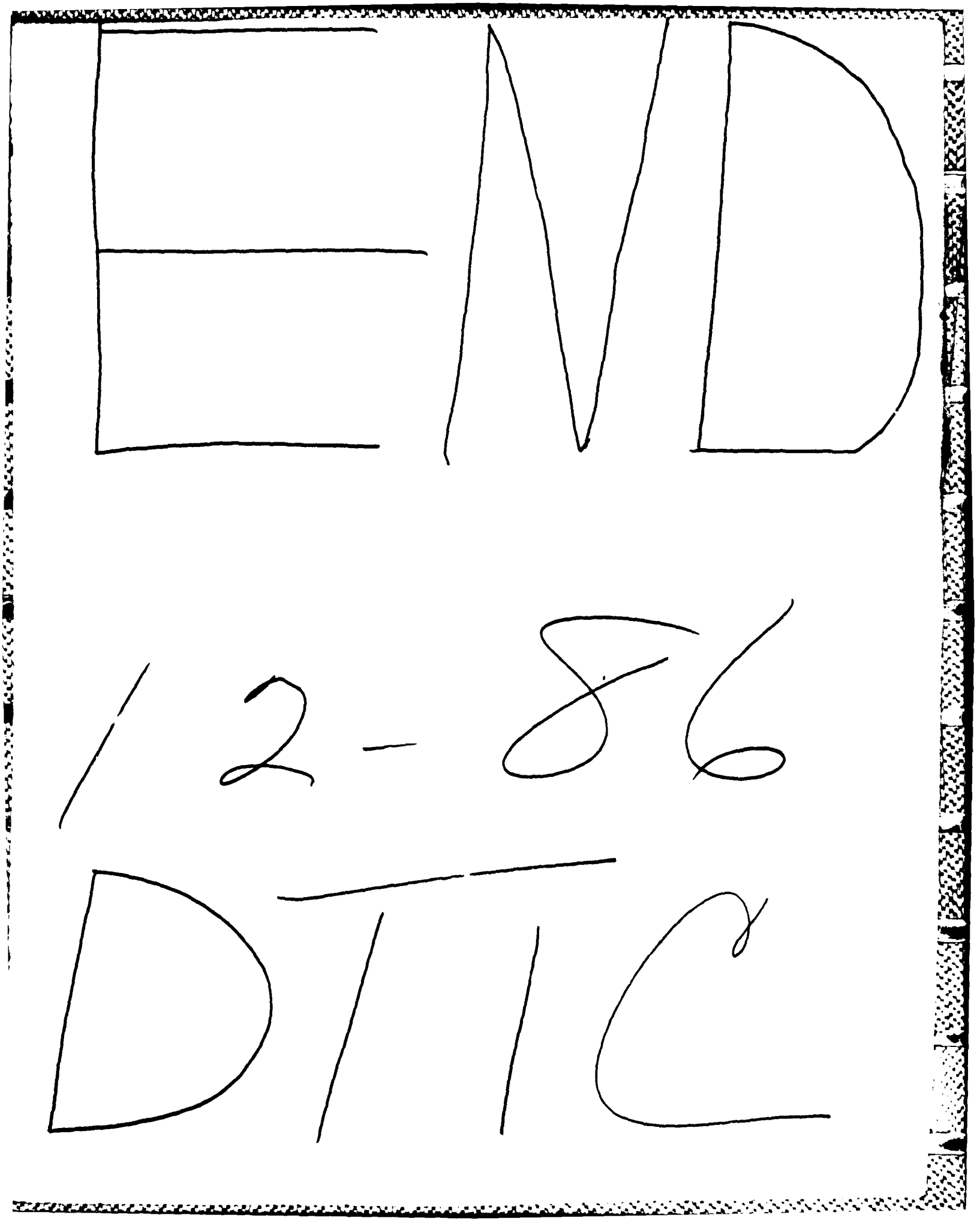
7. ECP FORMALIZATION/GENERATION

Two ECPs are being formalized for the following improvements to the AMSDT system:

- Touch-Screen Capability
- Thermal Cycling Capability

These ECP's are expected to be released shortly from the Harris Program office to USACECOM for review.

An ECP concerning a Shared Resource Management (SRM) concept continues to be studied by the project team for possible introduction into the AMSDT program. The SRM concept would enhance the system capabilities and maximize the system usage time.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